

# Percutaneous coronary intervention of an obstructive left anterior descending artery with anomalous origin of right coronary artery

**Laxman Dubey<sup>(1)</sup>**

## Case Report

### Abstract

Coronary artery anomalies are a rare type of congenital anomalies with an incidence of 1.3% during routine cardiac catheterization. Anomalous origin of the coronary arteries is considered an incidental finding without clinical significance. This case describes a patient in whom evaluation of chest pain revealed an obstructive left anterior descending artery as well as an anomalous right coronary artery arising from the left coronary sinus. The patient underwent successful percutaneous coronary intervention of the left anterior descending artery and was discharged home free of angina 3 days later.

**Keywords:** Anomalous Right Coronary Artery, Obstructive Left Anterior Descending Artery, Percutaneous Coronary Intervention

*Date of submission:* 4 Jul 2012, *Date of acceptance:* 8 Nov 2012

### Introduction

The incidence of coronary anomalies was found to be 1.3% in a large series of patients undergoing coronary angiography.<sup>1</sup> Of these, most were abnormalities of the origin of the coronary arteries, and a few were coronary artery fistulas. Anomalous origin of the coronary arteries is considered an incidental finding without clinical significance; however, these abnormalities may be responsible for angina pectoris, heart failure and increased risk of sudden death. This case describes a patient in whom evaluation of chest pain revealed an obstructive left anterior descending artery as well as an anomalous right coronary artery arising from the left coronary sinus. The patient underwent successful percutaneous coronary intervention of the left anterior descending artery.

### Case Report

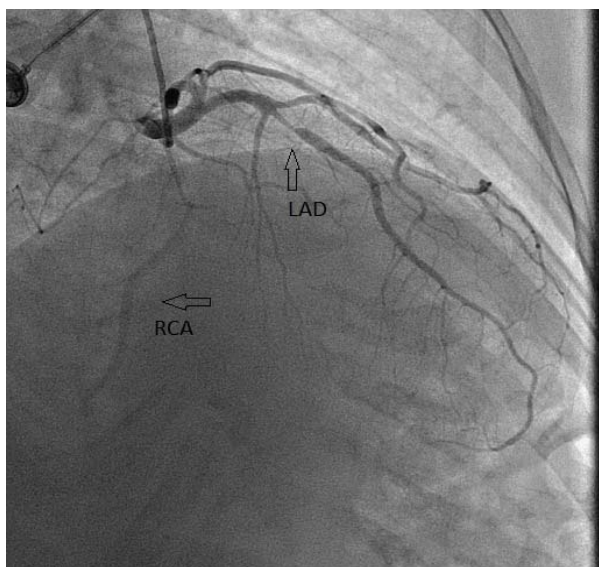
A 52-year-old female presented to our center with exertional chest pain for the previous 7 days which had increased in intensity for 1 day. Pain was associated with sweating. She had a history of systemic hypertension but was not on medication. Her electrocardiogram showed sinus rhythm with non-specific T-wave abnormalities. Clinical examination revealed a moderately built female with a blood pressure of 140/80mmHg and a regular pulse at 78 beats per minute. Hemoglobin, white

cell count, differential white cell count, serum electrolytes, renal function tests, and liver function tests were within normal limits. CK-MB was 28U/L and troponin I was negative. Transthoracic echo showed grade 1 left ventricular (LV) diastolic dysfunction, normal LV systolic function, and no wall motion abnormalities. Cardiac catheterization was done via right radial artery approach. Selective catheterization of the left coronary artery (LCA) showed normal left main (LM) coronary artery, normal left circumflex artery (LCX) coronary artery, and a significant obstructive lesion (80%) in mid part of the left anterior descending artery (LAD) just after the first diagonal branch, with good distal flow (Figure 1).

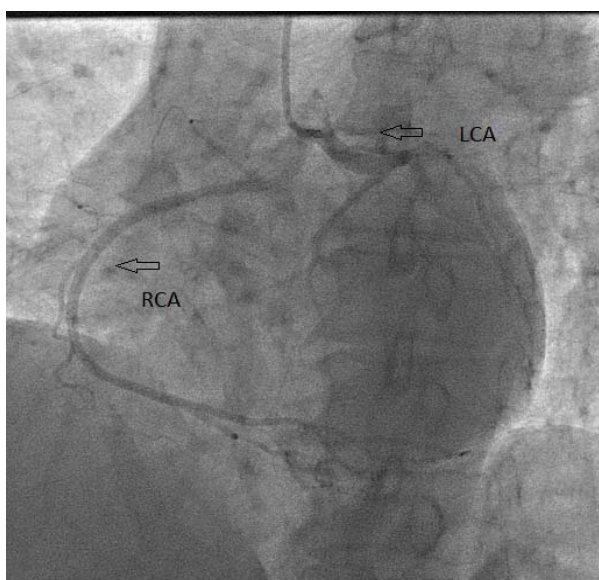
During selective catheterization of the LCA, filling in the right coronary artery (RCA) was noted. Attempted cannulation of the RCA was difficult. Nonselective coronary angiography revealed aberrant dominant RCA arising from the left aortic sinus adjacent to the origin of the LCA (Figure 2). Selective coronary angiography of RCA showed anomalous origin from left aortic sinus; however, RCA had no significant stenotic lesions (Figure 3). The diagnosis of obstructive LAD lesion with anomalous origin of the RCA from the left aortic sinus was made. The LM artery was engaged with 6 French Judkins left 3.5 guiding catheter (Cordis). A 0.014 inch BMW (Abbott) guidewire was used to

1- Department of Cardiology, College of Medical Sciences and Teaching Hospital, Bharatpur, Nepal  
Correspondence to: Laxman Dubey, Email: dubeylax@yahoo.com

cross the lesion. An Integrity 3.5 x 18 mm bare metal stent (Medtronic) was deployed with final good result and Thrombolysis in Myocardial Infarction (TIMI) III flow (Figure 4). The patient's subsequent hospital stay was uneventful, and she was discharged home free of angina 3 days later. At 1 month follow-up, patient remained asymptomatic and a treadmill exercise test was negative for inducible myocardial ischemia.



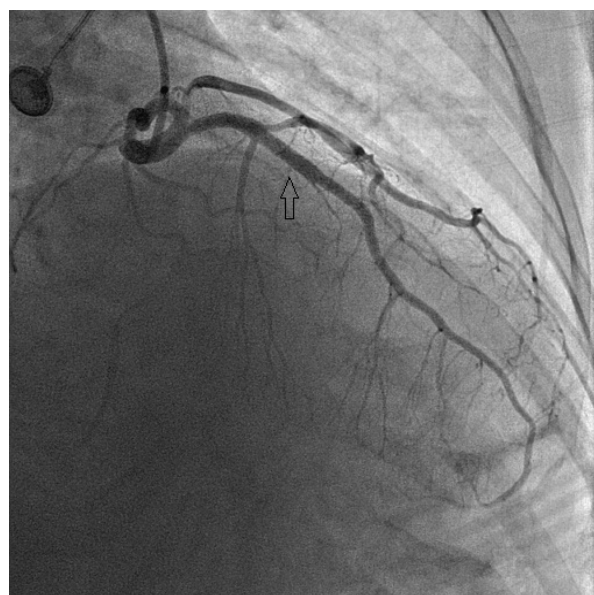
**Figure 1.** Selective coronary angiography of the left coronary artery (LCA) showed significant obstructive lesion in the mid part of the left anterior descending artery (LAD) just after the first diagonal branch, and also filling in the right coronary artery (RCA) was note



**Figure 2.** Nonselective coronary angiography revealed aberrant dominant right coronary artery (RCA) arising from the left aortic sinus adjacent to the origin of the left coronary artery (LCA)



**Figure 3.** Selective coronary angiography of the right coronary artery from the left aortic sinus



**Figure 4.** Final result after successful stent deployment in the left anterior descending artery (arrow)

## Discussion

Anomalous origin of the right coronary artery (RCA) is a rare congenital anomaly that was first described in 1948 by White and Edwards.<sup>2</sup> Coronary artery anomalies are present in 1.3% of the population who undergo coronary angiography.<sup>1</sup> Of these, 90% are abnormalities of the origin of the coronary arteries, and the rest are coronary artery fistulas. Two-thirds of anomalous origins are the LCX arising from the right sinus and crossing behind the aorta, or the LAD and LCX arising separately from the left sinus. The other one-third

are aberrant origin of the RCA from the left sinus of Valsalva.

The incidence of anomalous RCA in congenital coronary anomalies is variable in different populations, with the highest incidence in Indian and the lowest incidence in German populations (0.46% and 0.04%, respectively).<sup>3,4</sup> Angelini reported that the incidence of anomalous origination of the RCA from the left sinus is 0.92%.<sup>5</sup> Kaku et al. examined 17,731 patients undergoing coronary angiography in Japanese centers between 1968 and 1994 and noted a prevalence of 0.25%.<sup>6</sup>

Most of the coronary anomalies remain asymptomatic and are incidental to investigations by coronary angiography. However, some have reported that an anomalous origin of the RCA can lead to angina pectoris, myocardial infarction, or sudden death even in the absence of atherosclerosis.<sup>6</sup> The pathophysiologic basis for this association is unclear. Angina, infarction, or sudden death in these cases may be triggered by myocardial ischemia. The ischemia appears to be secondary to a combination of several factors that produce obstruction, such as mechanical compression of the RCA by the great vessels or the oblique angle at the juncture of the anomalous right coronary artery and a slit-like orifice in the aortic wall, which can collapse during exercise, produced by the left coronary sinus.<sup>6</sup>

Anomalous left main coronary artery as the cardiac anomaly has been shown to be associated with sudden cardiac death, but the choice of treatment in anomalous origin of RCA is controversial.<sup>7</sup> Proposed options include translocation of the RCA to the aorta, ostioplasty, and bypass grafting of the RCA, with optional ligation of the native artery proximal to the graft anastomosis to prevent competitive flow.<sup>7,8</sup> However, the long-term benefits of such therapies have not yet been demonstrated. Surgery in patients older than 35 years is not advised because sudden death mostly occurs before 35 years of age and the risk of sudden death decreases with age.<sup>8,9</sup> In such cases the chief aim is good symptomatic relief. In a five year follow-up study in congenital coronary anomaly managed medically, no death was found to be directly related to the congenital anomaly.<sup>6</sup>

In conclusion, the congenital anomaly in this

case was an incidental finding, since the patient's initial clinical presentation was suggestive of significant atherosclerotic coronary heart disease. This case represents a rare case of anomalous origin of the RCA from the left sinus and successful PCI to severe stenosis at the mid LAD with good result.

### Conflict of Interests

Authors have no conflict of interests.

### References

1. Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cathet Cardiovasc Diagn* 1990; 21(1): 28-40.
2. White NK, Edwards JE. Anomalies of the coronary arteries; report of four cases. *Arch Pathol (Chic)* 1948; 45(6): 766-71.
3. Cieslinski G, Rappich B, Kober G. Coronary anomalies: incidence and importance. *Clin Cardiol* 1993; 16(10): 711-5.
4. Garg N, Tewari S, Kapoor A, Gupta DK, Sinha N. Primary congenital anomalies of the coronary arteries: a coronary arteriographic study. *Int J Cardiol* 2000; 74(1): 39-46.
5. Angelini P. Coronary artery anomalies: an entity in search of an identity. *Circulation* 2007; 115(10): 1296-305.
6. Kaku B, Shimizu M, Yoshio H, Ino H, Mizuno S, Kanaya H, et al. Clinical features of prognosis of Japanese patients with anomalous origin of the coronary artery. *Jpn Circ J* 1996; 60(10): 731-41.
7. Taylor AJ, Rogan KM, Virmani R. Sudden cardiac death associated with isolated congenital coronary artery anomalies. *J Am Coll Cardiol* 1992; 20(3): 640-7.
8. Shah AS, Milano CA, Lucke JP. Anomalous origin of the right coronary artery from the left coronary sinus: case report and review of surgical treatments. *Cardiovasc Surg* 2000; 8(4): 284-6.
9. Hamzeh G, Crespo A, Estaran R, Rodriguez MA, Voces R, Aramendi JJ. Anomalous origin of right coronary artery from left coronary sinus. *Asian Cardiovasc Thorac Ann* 2008; 16(4): 305-8.

**How to cite this article:** Dubey L. Percutaneous coronary intervention of an obstructive left anterior descending artery with anomalous origin of right coronary artery. *ARYA Atheroscler* 2013; 9(2): 164-6.